

Warm-Up:

1) Graph.

$$\frac{(x-5)^2}{4} + \frac{(y+2)^2}{49} = 1$$

$$C: (5, -2)$$

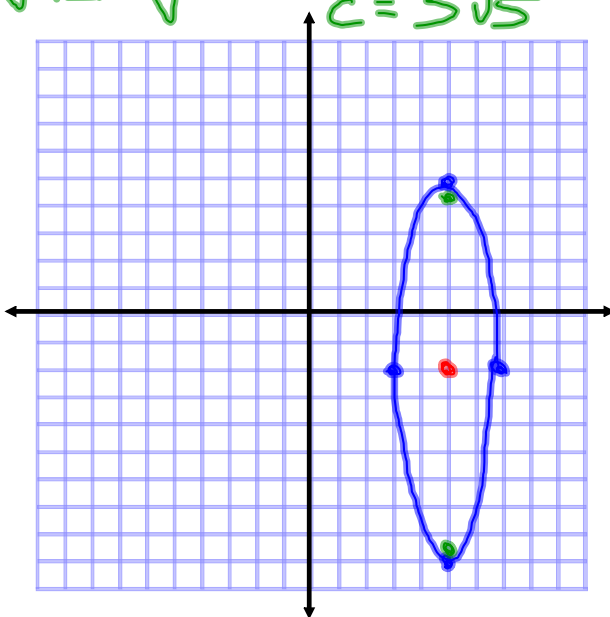
$$a^2 - b^2 = c^2$$

$$49 - 4 = c^2$$

$$\sqrt{45} = \sqrt{c^2}$$

$$c = \sqrt{45}$$

$$c = 3\sqrt{5}$$



24, 25, 20

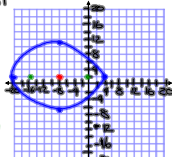
$$20) \frac{(x+8)^2}{144} + \frac{(y-2)^2}{81} = 1$$

$$C: (-8, 2)$$

$$\text{Major Axis: } 24$$

$$\text{Minor Axis: } 18$$

$$\text{Foci: } (-8 \pm 3\sqrt{5}, 2)$$



$$21) 7x^2 + 3y^2 - 28x - 12y = -11$$

$$7x^2 - 28x + 3y^2 - 12y = -11$$

$$7(x^2 - 4x + 4) + 3(y^2 - 4y + 4) = -11 + 28 + 12$$

$$7(x-2)^2 + 3(y-2)^2 = 29$$

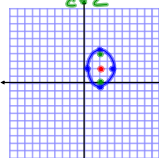
$$\frac{(x-2)^2}{\frac{29}{7}} + \frac{(y-2)^2}{\frac{29}{3}} = 1$$

$$C: (2, 2)$$

$$\text{Minor Axis: } 2\sqrt{3}$$

$$\text{Major Axis: } 2\sqrt{7}$$

$$\text{Foci: } (2, 4) \text{ and } (2, 0)$$



$$22) 16x^2 + 25y^2 + 32x - 150y = 159$$

$$16x^2 + 32x + 25y^2 - 150y = 159$$

$$16(x^2 + 2x + 1) + 25(y^2 - 6y + 9) = 159 + 16 + 225$$

$$\frac{16(x+1)^2}{160} + \frac{25(y-3)^2}{400} = 400$$

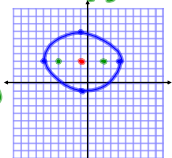
$$\frac{(x+1)^2}{25} + \frac{(y-3)^2}{16} = 1$$

$$C: (-1, 3)$$

$$\text{Major Axis: } 10$$

$$\text{Minor Axis: } 8$$

$$\text{Foci: } (-1, 3) \text{ and } (-1, 3)$$



Examples:

1) Write an equation for the ellipse.

$$C: (0, 0)$$

$$a = 5 \quad c = 4$$

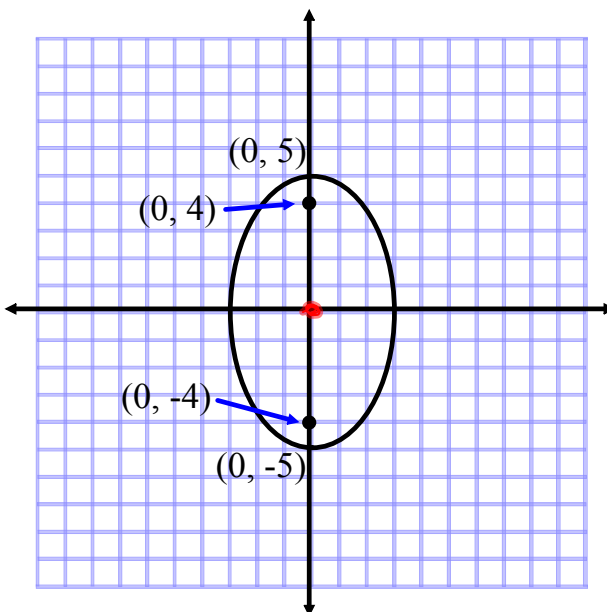
$$a^2 - b^2 = c^2$$

$$25 - b^2 = 16$$

$$-b^2 = -9$$

$$b = 3$$

$$\frac{x^2}{9} + \frac{y^2}{25} = 1$$



Examples:

2) A listener is standing in an elliptical room 150 feet wide and 320 feet long. When a speaker stands at one focus and whispers, the best place for the listener to stand is at the other focus.

a) Write an equation for this ellipse. Assume the major axis is horizontal and the center is at the origin.

$$C: (0, 0)$$

$$a = 160$$

$$b = 75$$

$$\frac{x^2}{25600} + \frac{y^2}{5625} = 1$$

b) How far apart should the speaker and the listener be in this room?

$$a^2 - b^2 = c^2$$

$$25600 - 5625 = c^2$$

$$\sqrt{19975} = c$$

$$141.3 = c$$

$$282.6 \text{ ft}$$

Examples:

3) Write an equation for the ellipse satisfying the set of conditions.

Endpoints of the major axis at $(-7, 2)$ and $(5, 2)$. Endpoints of the minor axis at $(-1, 0)$ and $(-1, 4)$

$$C: (-1, 2)$$
$$a = 6$$
$$b = 2$$

$$\frac{(x+1)^2}{36} + \frac{(y-2)^2}{4} = 1$$

Homework: pg. 586-588 #10, 12, 14, 26-31 all, 40, 41

Quiz Next Class over 10-3, 10-4